CLAIMS

What is claimed is:

1. A disc type recording medium on which data is recorded by forming at least one disc track, the medium comprising at least one data frame having a plurality of sync frames,

wherein the number of the plurality of sync frames is determined according to a length of an innermost circumference of the disc type recording medium.

2. The medium of claim 1, wherein:

the number of the plurality of sync frames is *N/d*,

d is determined such that a length of each data frame is shorter than or the same as the length of the innermost circumference of the disc type recording medium, and

N and *d* are positive integers.

3. The medium of claim 1, wherein:

n/d sync frames are used to express a predetermined unit of information,

d is determined such that the length of the at least one data frame is shorter than or the same as the length of the innermost circumference of the disc type recording medium, and

n is a positive integer that is smaller than *N*.

4. The medium of claim 2, wherein a period of a wobble, which is used to form the at least one disc track of the disc type recording medium, is *MT* when each data frame includes *N* sync frames, and the period of a wobble is *Mt* when the data frame includes *N/d* sync frames and M/d is not a positive integer, wherein,

T denotes a period of a one-channel clock,

t denotes T/d, and

M is a positive integer.

5. The medium of claim 4, wherein a clock for data recording is T obtained by demultiplying the period T/d of the clock by *d* when the period of a wobble is *Mt* and a period of a clock obtained using a phase locked loop (PLL) is T/d.

6. The medium of claim 3, wherein the predetermined unit of information is a bit of information.

7. The medium of claim 1, wherein the data comprises at least one of address information and disc related information.

8. The medium of claim 3, wherein *n* is 2 and *N* is either 496 or 298.

9. The medium of claim 1, wherein *n* sync frames are used to express a predetermined unit of information,

wherein the predetermined unit of information is determined such that the length of the data frame is shorter than or the same as the length of the innermost circumference of the disc type recording medium, and *n* is a positive integer.

10. The medium of claim 9, wherein *n* is 2 and *N* is either 496 or 298, and the predetermined unit of information is 2 bits of information.

11. A disc type recording medium for recording information by forming a plurality of disc tracks, the medium comprising:

at least two first sections in which the disc tracks are formed using a first function having a first frequency; and

at least one second section in which the disc tracks are formed using a second function having a second frequency, which is 1/k times the first frequency,

wherein the second section is positioned between the first sections and *k* is a positive integer.

12. The medium of claim 11, wherein the first sections are used for a PLL and the first function has a single frequency.

13. The medium of claim 11, wherein the second section is allotted to record address information for disc access and comprises two first sub sections using the second function and a second sub section using a third function having a frequency that is the same as the first frequency,

wherein the third function has a different phase from a phase of the first function.

14. The medium of claim 13, wherein the two first sub sections have the same frequency but different phases.

15. The medium of claim 13, wherein the second sub section is positioned between the first sub sections.

16. The medium of claim 11, wherein the second frequency is half of the first frequency.

17. A disc type recording medium for recording information by forming disc tracks, the medium comprising:

at least two first sections in which the disc tracks are formed using a first function, the first function having a primary differential value; and

at least one second section in which the disc tracks are formed using a second function, the second function having a primary differential value, wherein,

the second section is positioned between the first sections,

the difference between primary differential values of the first and second function at points where the first sections and the second section meet is less than 50% of the primary differential value of the first function, and

the second function used in the second section has a point at which the primary differential value is 0 or does not include discontinuities.

18. The medium of claim 17, wherein in the first section is used for a PLL and the function has a single frequency.

19. The medium of claim 17, wherein the second section is allotted to record address information for disc access and comprises two first sub sections using the second function and a second sub section using a third function having a frequency that is the same as a frequency of the first function,

wherein the second sub section is positioned between the first sub sections and the third function has a different phase from a phase of the first function.

20. The medium of claim 16, wherein the first function is expressed as $-\sin(2*\pi*f_{wob}*t)$ and the second function is expressed as $\{2*(t-R_a)*f_{wob}\}^4-1$ or $1-\{2*(t-R_a)*f_{wob}\}^4$,

wherein $R_a=[t*f_{wob}]/f_{wob}+1/(2*f_{wob})$ and $[t*f_{wob}]$ is a maximum integer that does not exceed $t*f_{wob}$.

21. A method of forming disc tracks for recording information, comprising:

forming disc tracks using a first function in a plurality of first sections of a disc type recording medium; and

forming disc tracks using a second function in a second section of the disc type recording medium,

wherein the first function and the second function have frequencies, and the frequency of the second function is 1/n times the frequency of the first function, and

the second section is positioned between the first sections.

22. The method of claim 21, wherein in the first section is used for a PLL.

23. The method of claim 22, wherein the first function has a single frequency.

24. The method of claim 21, wherein the second section is allotted to record address information for disc access and includes two first sub sections, each first subsection using the second function, and a second sub section using a third function having a frequency that is the same as the frequency of the first function,

wherein the first function has a phase and the third function has a phase that is different than the phase of the first function.

25. The method of claim 24, wherein the second function used in each of the first sub sections has the same frequency but a different phase, and the second sub section is positioned between the first sub sections.

26. The method of claim 21, wherein the frequency of the second function is half the frequency of the first function.

27. A method of forming disc tracks for recording information, comprising:

forming disc tracks using a first function in a plurality of first sections of a disc type recording medium, the first function having a primary differential value; and

forming disc tracks using a second function in a second section of the disc type recording medium, the second function having a primary differential value,

wherein the second section is positioned between the first sections and the difference between primary differential values of the first and second functions at points where the first sections and the second section meet is less than 50% of the primary differential value of the first function, and the second function has a point at which the primary differential value is 0 or does not include discontinuities.

28. The method of claim 27, wherein the first sections is used for a PLL.

29. The method of claim 28, wherein the first function has a single frequency.

30. The method of claim 27, wherein the second section is allotted to record address information for disc access and comprises two first sub sections using the second function and a second sub section using a third function having a frequency that is the same as the frequency of the first function,

wherein the second sub section is positioned between the first sub sections, and the third function has a different phase from a phase of the first function.

31. The method of claim 27, wherein the first function is expressed as $-\sin(2*\pi*f_{wob}*t)$ and the second function is expressed as $\{2*(t-R_a)*f_{wob}\}^4-1$ or $1-\{2*(t-R_a)*f_{wob}\}^4$,

wherein $R_a=[t*f_{wob}]/f_{wob}+1/(2*f_{wob})$ and $[t*f_{wob}]$ is a maximum integer that does not exceed $t*f_{wob}$.

32. A computer readable recording medium for recording a program that executes a method of forming disc tracks for recording additional information, wherein the method comprises:

forming disc tracks in a plurality of first sections of the computer readable recording medium using a first function; and

forming disc tracks in a second section of the computer readable recording medium using a second function,

wherein,

the second section is positioned between the first sections,

the first function and the second function have primary differential values,

the difference between primary differential values of the first function and second function at points where the first sections and the second section meet is less than 50% of the primary differential value of the first function, and

the second function used in the second section has a point at which the primary differential value is 0 or does not include discontinuities.

33. The medium of claim 32, wherein the first section is used for a PLL.

34. The medium of claim 33, wherein the first function has a single frequency.

35. The medium of claim 32, wherein the second section is allotted to record address information for disc access and comprises two first sub sections using the second function and a second sub section using a third function having a frequency that is the same as the frequency of the first function,

wherein the second sub section is positioned between the first sub sections and the third function has a different phase from a phase of the first function.

36. The medium of claim 32, wherein the first function is expressed as $-\sin(2*\pi*f_{wob}*t)$ and the second function is expressed as $\{2*(t-R_a)*f_{wob}\}^4-1$ or $1-\{2*(t-R_a)*f_{wob}\}^4$,

wherein $R_a=[t*f_{wob}]/f_{wob}+1/(2*f_{wob})$ and $[t*f_{wob}]$ is a maximum integer that does not exceed $t*f_{wob}$.

37. A method of storing data on an optical disc, the method comprising:

forming a data frame and an address unit, both the data frame and the address unit having an extensible format to allow for storage of data structures having a length greater than a length of an innermost track of the optical disc.

38. The method of claim 37, wherein the data frame is N/d sync frames long and the address unit is n/d sync frames long and n is a positive integer smaller than N and d is determined such that the length of the data frame is shorter than or the same length as the length of the innermost track of the optical disc.

39. The method of claim 37, wherein the data frame is N/d sync frames long, the address unit is m sync frames long, m is a positive integer, and N/d is evenly divisible by m.

40. The method of claim 39, further comprising recording a plurality of address units in the data frame, and recording a plurality of bits of information in each of the plurality of address units.

41. The method of claim 40, wherein when a physical length of data is greater than the length of the data frame, all the data is stored in the data frame by including plural-bit information in the address unit and increasing a number of parities to reduce an error rate.

42. The method of claim 40, further comprising recording each of the plurality of address units in the data frame a number of times p' to minimize an error rate, wherein p' is less than a number p, p being a number of times the plurality of address units are recorded when the data frame comprises singular-bit information.

43. The method of claim 37, wherein a data decoding technique used to decode the data structure is also used to decode a data structure having N sync bits and a plurality of address units, each address unit having n sync frames.

44. The method of claim 37, wherein the data frame is compatible with a data frame comprising N sync bits and a plurality of address units, each address unit having n sync frames.